
Environmental Assessment Supporting Proposed Rule: Mitigation of Beyond-Design-Basis Events

**U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation**

April 2015



UNITED STATES NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) is proposing a rule to require mitigation strategies for beyond-design-basis events at nuclear power plants (NPPs). The proposed rule would: (1) make the requirements in Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events* (Agencywide Document Access and Management System (ADAMS) Accession No. ML12054A736) and Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation* (ADAMS Accession No. ML12056A044) generically-applicable; (2) establish regulatory requirements for Severe Accident Management Guidelines (SAMGs) as part of an integrated response capability including supporting requirements for command and control, drills, training and change control; (3) require numerous enhanced onsite emergency response capabilities currently being implemented in conjunction with Order EA-12-049 (e.g., staffing and communications, facilities and equipment, multi-source dose assessment, training and exercises); (4) provide requirements for mitigating strategies for new reactor designs; and (5) address a number of petitions for rulemaking (PRMs) submitted in the aftermath of the March 2011 Fukushima Dai-ichi event..

The proposed rulemaking would amend the following requirements: Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 Appendix E Sections IV and VI; 10 CFR 50.34; 52.47; 52.79; 52.80; 52.137; and 52.157. The rule would add new requirements to two sections of Part 50: 10 CFR 50.155 and 10 CFR Part 50 Appendix E Section VII. Finally, the rulemaking would

make conforming changes to sections of Parts 50 and 52 to consolidate onsite emergency response procedures and to include new application requirements. The conforming changes would delete 10 CFR 50.54(hh)(2), move the requirements to 10 CFR 50.155(b)(2), and re-number the remaining requirements under 10 CFR 50.54(hh). Conforming changes also would update the references in 10 CFR 50.34(i) and 52.80(d) to reflect new requirements in 10 CFR 50.155 and 10 CFR Part 50 Appendix E Section VII

Historical Background and Overview:

As discussed in section II of the proposed rule notice, the NRC has undertaken numerous regulatory actions in the aftermath of the Fukushima event. These actions included the efforts of the Near Term Task Force (NTTF) and the development of the associated NTTF recommendations, the NRC's response to the task force report to both identify actions to be taken in the near term and to prioritize the NTTF recommendations, issuance of regulatory actions including orders and request for information under 10 CFR 50.54(f), and finally efforts to begin two rulemakings. The regulatory efforts to address lessons-learned from Fukushima have evolved over time, and with regard to this proposed rulemaking there were several interactions with the Commission that led to a consolidation of two rulemaking efforts into the proposed mitigation of beyond-design-basis events rulemaking. Section II.D of the proposed rule *Federal Register* notice provides a discussion of the consolidation of the regulatory efforts. Section IV of the proposed rule *Federal Register* notice provides a discussion of the scope of the proposed mitigation of beyond-design-basis events rulemaking with respect to the associated NTTF recommendations.

PROPOSED RULE AMENDMENTS

Amendments to Existing Sections:

The following existing sections in 10 CFR Part 50 would be amended as a result of the proposed rule:

- 10 CFR Part 50 Appendix E Section IV, Content of Emergency Plans
- 10 CFR Part 50 Appendix E Section VI, Emergency Response Data System

The amendments also would add two new sections — 10 CFR 50.155 and 10 CFR Part 50 Appendix E Section VII — and new paragraphs to 10 CFR Part 50 and Part 52:

- 10 CFR 50.155, Mitigation of Beyond-Design-Basis Events
- 10 CFR Part 50 Appendix E Section VII, Communications and Staffing Requirements for the Mitigation of Beyond-Design-Basis Events
- 10 CFR 50.34 (a) and (b), Contents of applications; technical information
- 10 CFR 52.47, Contents of applications; technical information
- 10 CFR 52.79, Contents of applications; technical information in final safety analysis report
- 10 CFR 52.137, Contents of applications; technical information
- 10 CFR 52.157, Contents of applications; technical information in final safety analysis report

Conforming Changes:

The proposed rulemaking makes conforming changes to the following sections in order to consolidate onsite emergency response procedures for the mitigation of beyond-design-basis events into one chapter of 10 CFR:

- 10 CFR Part 50 Appendix E Section I, Introduction, would be revised to reference the new requirements in 10 CFR Part 50 Appendix E Section VII.

- 10 CFR 50.54(hh)(1), 50.54(hh)(2), and 50.54(hh)(3), Conditions of licenses, would be revised to relocate Section 50.54(hh)(2) to Section 50.155(b)(2), while 10 CFR 50.54(hh)(3) would be renumbered.
- 10 CFR 50.34(i), Contents of applications; technical information would be revised to add the application requirements in 10 CFR 50.155 and 10 CFR part 50 Appendix E Section VII.
- 10 CFR 52.80(d), Contents of applications; additional technical information would be revised to include the application requirements in 10 CFR 50.155 and 10 CFR part 50 Appendix E Section VII.

ENVIRONMENTAL ASSESSMENT

Identification of the Action:

The regulatory objectives of the proposed rulemaking are as follows:

1. Make the requirements in Order EA-12-049 and Order EA-12-051 generically-applicable. The rulemaking would incorporate the requirements in Order EA-12-049 and Order EA-12-051 into the NRC's regulations so that they apply to all future nuclear power plant license applicants and provide regulatory clarity to operating reactors. With the exception of Watts Bar Unit 2 and Bellafonte, any future licensees would not be bound by the Orders. In the absence of a rule, these requirements would need to be implemented for new reactor sites through additional Orders or license conditions (as was done for the Vogtle and Summer combined licenses).

As part of the rulemaking process, the NRC considered stakeholder feedback and lessons learned from the implementation of the Orders to evaluate unintended consequences or challenges associated with the implementation of

the mitigation strategies, as directed by the Commission in *Staff Requirements—Briefing on the Status of Lessons Learned from the Fukushima Dai-ichi Accident*, August 2012 (ADAMS Accession No. ML122400033). Pursuing rulemaking allows the NRC to make the Order requirements generically-applicable, while making adjustments to account for lessons learned from implementation of the Orders (these adjustments would result in more effective regulation, but would not extend beyond the existing scope of Order EA-12-049 and Order EA-12-051). Once the proposed rule is implemented, the NRC may choose to rescind or relax Order EA-12-049 and Order EA-12-051.

2. Establish requirements for SAMGs as part of an integrated response capability to promote consistency across industry. Currently, SAMGs are voluntary industry initiatives, and as such, licensees are not required to update and maintain the SAMGs. After the accident at Fukushima Dai-ichi, NRC inspection (Temporary Instruction (TI)-2515/184 “Availability and Readiness Inspection of Severe Accident Mitigation Guidelines (SAMGs)”) concluded that while most licensees have written SAMGs following generic guidelines established by the nuclear power industry owners groups, training and procedural control for SAMGs are inconsistent across the industry. Some licensees had not maintained the SAMGs in accordance with the latest revisions of the applicable industry owners group’s generic technical guidelines, or did not have a consistent and systematic training approach. The inspectors attributed the inconsistent implementation and training of SAMGs to the voluntary nature of this initiative. An objective of the rulemaking would be to require licensees to update and maintain their SAMGs to be consistent with the generic technical guideline documents (recently updated to reflect lessons learned from the Fukushima

event) and to reflect the plant configuration (i.e., place the SAMGs within the plant configuration management system). This would also result in the SAMGs reflecting the new mitigation capabilities currently being implemented as a result of Order EA-12-049. The rulemaking would also require that SAMGs be integrated with the existing symptom-based emergency operating procedures and other currently required guideline sets to establish an integrated response capability for beyond-design-basis events.

3. Incorporate enhanced onsite emergency response capabilities. Numerous onsite emergency response actions are addressed in this rulemaking. These activities are being implemented in conjunction with the implementation of Order EA-12-049 and through the development of guidance supporting the onsite emergency response portion of the consolidated rulemaking. These new requirements would result in enhanced capabilities that include actions associated with staffing and communications (based on NTTF Recommendation 9.3, 9.1, and 9.2), facilities and equipment (based on NTTF Recommendation 9.3, 9.1, and 9.2), training and exercises (based on NTTF Recommendation 9.3, 9.1, and 9.2), command and control structure and decision-maker qualifications (based on NTTF Recommendation 10.2), and multi-source dose assessment (based on NTTF Recommendation 9.3 and 9.1). Requiring current and future licensees to meet these requirements would ensure robust onsite emergency response capabilities for beyond-design-basis events.
4. Provide requirements for mitigating strategies for new reactor designs. An objective of this proposed rulemaking is to establish requirements for applicants for new reactor designs to provide mitigating strategies for beyond-design-basis events. Applicants would be required to include design features in the plant

design sufficient to enhance coping durations and minimize reliance on human actions to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities during an extended loss of all ac power concurrent with either a loss of normal access to the ultimate heat sink or, for passive reactor designs, a loss of normal access to the normal heat sink.

To achieve these objectives, the proposed rulemaking would amend 10 CFR Parts 50 and 52 to require additional strategies and guidelines for responding to beyond-design-basis events including the development and implementation of SAMGs and other emergency preparedness actions.

The Need for the Action:

The proposed regulatory action stems from several NTTF Recommendations, which emphasized the need to establish mitigation strategies for beyond-design-basis events and enhance and streamline onsite emergency response capabilities such as extensive damage mitigation guidelines, emergency operating procedures (EOPs), and SAMGs, while building upon lessons learned from the events at the Fukushima Dai-ichi NPP. The proposed rule contains a number of proposed requirements, that include modifications that the NRC has determined are necessary for the adequate protection of human health and the environment. In addition, the NRC is taking this action to accomplish the objectives stated in the previous section.

Environmental Impacts of the Proposed Action:

This environmental assessment focuses on the following provision of the proposed rule that the NRC believes could have potential environmental impacts:

- 10 CFR 50.155(b)(1) and 10 CFR 50.155(c)(2) require strategies and guidelines to mitigate beyond-design basis external events, including reasonable protection of the equipment used for mitigation strategies. This section would require the establishment of additional onsite and offsite facilities, which would have the potential to impact the environment both during and after construction. Sites would need to build new structures to house onsite equipment so that it is reasonably protected from the effects of severe natural phenomena. In addition, two new offsite facilities—one in Phoenix, Arizona and another in Memphis, Tennessee—have been established to house equipment and replacement parts that can be deployed to any plant in the U.S. in case of an emergency. Any new construction might impact public health as well as ecosystem health (e.g., changes in land use, air pollution, and water quality). Buildings that are already constructed also may have an environmental impact because of the resources required to maintain them.

The NRC has concluded that there will be no significant radiological environmental impacts associated with implementation of the proposed rule requirements for the following reasons:

- (1) The proposed strategies to mitigate beyond-design-basis events would not result in changes to the design-basis requirements for the structures, systems, and components (SSCs) in affected licensees' facilities that function to limit the release of radiological effluents during and following postulated accidents. Therefore, all SSCs associated with limiting the releases of offsite radiological effluents would continue to be able to perform their functions, and as a result, there would be no significant radiological effluent impact.
- (2) The implementation of the mitigation of beyond-design-basis events rulemaking would not affect the standards and requirements applicable to radiological releases and effluents.

The principal effect of this action would be to make requirements that have already been imposed by Order (i.e., EA-12-049 and EA-12-051) generically-applicable, to strengthen emergency response procedures, and to add additional requirements consistent with the rulemaking objectives discussed previously. As none of the revisions would affect current occupational exposure requirements, the NRC has concluded that this action would have no significant impact on occupational exposure.

The action would neither significantly increase the probability or consequences of accidents, nor result in changes in the types of effluents that may be released offsite. As a result, there would be no significant increase in occupational or public radiation exposure.

With regard to potential non-radiological impacts, implementation of the rule requirements would not have a significant impact on the environment. The proposed rule requirements drawn from Order EA-12-049, specifically 10 CFR 50.155(c)(2), would require some sites to build additional storage facilities or stage additional equipment onsite and offsite. Any impacts or disturbances to land caused by the construction or modification of facilities would be minimal. The NRC has previously determined that the Order EA-12-049 requirements provide a greater mitigation capability consistent with the overall defense-in-depth philosophy, and, therefore, greater assurance that the challenges posed by beyond-design-basis external events to power reactors do not pose an undue risk to public health and safety. These requirements are needed to provide reasonable assurance of adequate protection of public health and safety. In addition, the environmental impacts resulting from 10 CFR 50.155(c)(2) have been (or will be) incurred regardless of the proposed rule, because the construction of onsite storage facilities and the two Regional Response Centers is underway or completed in order to meet the requirements of Order EA-12-049. The proposed rulemaking may lead to future environmental impacts should the NRC license any new reactors that are not currently

subject to Order EA-12-049. While there may be additional environmental impacts beyond those imposed by Order EA-12-049, they are uncertain and attempts to estimate such impacts would be speculative at this point in time.

Accordingly, the NRC staff concludes that there would be no significant environmental impact associated with the proposed action.

Alternatives to the Proposed Action:

The NRC considered a number of non-rulemaking approaches to achieve its objectives including issuance of a generic communication; revision of regulatory guidance documents; clarification of inspection modules; revision of enforcement guidance; and issuance of orders. However, these alternatives would be less effective because non-rulemaking approaches cannot generically impose new regulatory requirements upon all current and future licensees. As a result, these alternatives cannot achieve the NRC's objectives.

Alternative Use of Resources:

The proposed action would not involve the use of any resources not previously considered by the NRC in past environmental statements for issuance of operating licenses for the facilities that would be affected by this action. With regard to the onsite storage of equipment required under 10 CFR 50.155 (c)(2), the NRC has already considered the impacts to onsite resources affected by this proposed rule as land has already been disturbed by the development of nuclear power plants. The NRC has determined that there are no irreversible commitments of resources associated with the offsite storage of equipment.

Agencies and Persons Consulted:

The NRC staff developed the proposed rule and this environmental assessment. In accordance with its stated policy, the NRC staff provided a copy of the proposed rule to designated liaison officials for each state. No other agencies were consulted.

FINDING OF NO SIGNIFICANT IMPACT

Based on the environmental assessment, the NRC concludes that the proposed action would not have a significant effect on the quality of the human environment, and an environmental impact statement is not required. Thus, the NRC has determined not to prepare an environmental impact statement for this action.

Documents may be examined and/or copied for a fee, at the NRC's Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland 20852. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Library component on the NRC web site <http://www.nrc.gov> (Electronic Reading Room).

Dated at Rockville, Maryland, this day of , 2015.

FOR THE NUCLEAR REGULATORY COMMISSION

Lawrence E. Kokajko, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation